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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,611	10/04/2000	Kohji Sakai	198004US2	7156

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EXAMINER

PHAM, HAI CHI

ART UNIT PAPER NUMBER

2861

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/678,611

Applicant(s)

SAKAI ET AL.

Examiner

Hai C Pham

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12 and 14-22 is/are rejected.
- 7) ☒ Claim(s) 11 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date (7 in total).
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. (U.S. 6,445,483) in view of Naiki et al. (U.S. 5,815,301).

Takada et al. discloses an optical scanning apparatus condensing a beam deflected by an optical deflector (polygon mirror 3) so as to form a beam spot on a surface to be scanned (surface 14), comprising two lenses (scanning lenses 12 and 13), a lens (second scanning lens 13) on the side surface to be scanned has a positive refracting power in the sub-scanning direction, and at least one lens surface of the lens surfaces of the two lenses is such that a shape in the sub-scanning section is a non-arc shape (second scanning lens 13 having the exit surface being non-arcuate) (col. 12, lines 34-59).

However, Takada et al. is silent about the refractive power characteristic of the first scanning lens.

Naiki et al. Discloses an optical scanning apparatus having two scanning lenses (9 and 10), wherein the first scanning lens (9) on the side of the deflector (3) has a negative refractive power in the sub-scanning direction while the second scanning lens (10) on the side of the surface to be scanned (4) has a positive refractive power in the sub-scanning direction (see Abstract) such that the balance of refractive power in the sub-scanning direction is maintained so as to avoid the magnification reduction due to increasing refractive power in the sub-scanning direction.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the first scanning lens of Takada et al. with a negative refractive power in the sub-scanning direction as taught by Naiki et al. The motivation for doing so would have been to maintain the balance of refractive power in the sub-scanning direction while avoiding the magnification reduction due to increasing refractive power in the sub-scanning direction as suggested by Naiki et al. at col. 3, lines 8-20.

With regard to claims 2, 5-9, 15, Takada et al. further teaches:

- The surface such that a shape in a sub-scanning direction is a non-arc shape is a sub-non-arc surface such that the non-arc shape changes according to the position in main scanning direction of the sub-scanning direction (the exit surface of the second scanning lens 13 being aspherical in the main scanning direction

and having a large curvature in the main scanning direction) (col. 12, lines 49-59),

- A shape of the sub-non-arc surface in a main scanning section is a non-arc shape (col. 12, lines 49-59),
- Said optical system comprises an anamorphic optical system (col. 7, lines 45-60),
- In each of the four lens surfaces of the two lenses, the curvatures in the main and sub-scanning directions are different from one another (col. 12, lines 34-59),
- The spot diameter in each of the main and sub-scanning directions is equal to or smaller than 50  $\mu\text{m}$  (col. 4, lines 54-59),
- A non-arc amount, which is an amount of difference of the non-arc shape in the sub-scanning section of the sub-non-arc from an arc, changes asymmetrically in the main scanning direction (the anamorphic scanning lens 13 having curvature difference between the main and sub-scanning directions and further having a thickness, which differs from one end to the other end of the lens in the sub-scanning direction) (col. 7, lines 4-21),
- The optical scanning device being a single beam system.

With regard to claim 4, Takada et al. further teaches the lateral magnification in the sub-scanning direction being set at 0.418 (col. 15, lines 60-61), and fails to disclose the claimed range values. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set the lateral magnification in the sub-scanning direction within the desired range values, since it has been held that where the

general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

4. Claims 10, 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Naiki et al., as applied to claim 1 above, and further in view of Yamawaki et al. (U.S. 6,046,835).

Takada et al. in view of Naiki et al., discloses all the basic limitations of the claimed invention including the two scanning lenses being separate and having an air separation therebetween, but except for the relationship between the lateral magnification in the sub-scanning direction at a central height and that at any image height and the plurality of light emitting sources.

Yamawaki et al. discloses a scanning optical apparatus comprising two laser units (21a and 21b), two scanning lenses (3 and 4) using a single polygon mirror for simultaneously deflecting and scanning the two light beams across the surface of the photosensitive drum (10) forming scan lines separate from each other in the sub-scanning direction, wherein the ratio between the lateral magnifications in the sub-scanning direction at respective on-axis and off-axis is set at 1.0 and can be increased by 8%, a range that clearly meets the claimed condition (see table 2 and associated discussions).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to set the ratio of the lateral magnifications at the above value as taught by Yamawaki et al. in the modified device of Takada et al. The

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motivation for doing so would have been to provide a high quality image without being affected by the temperature change.

5. Claims 17-18 and 20, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Naiki et al. and Yamawaki et al., as applied to claims 1, 14, 16 above, and further in view of Ota et al. (U.S. 5,305,022).

Takada et al., as modified, discloses all the basic limitations of the claimed invention except for the plurality of light sources being provided as a laser array with the interval of the light emitting points equal to or larger than 10  $\mu\text{m}$ , and the developer.

Ota et al. discloses a multi-beam scanning recording apparatus having a semiconductor laser array for simultaneously scanning the surface of the photosensitive drum to form an electrostatic latent image, which is developed to become a visible toner image, wherein the interval between the light emitting sources in the semiconductor laser array can be set at least at 10  $\mu\text{m}$  (col. 1, lines 36-48).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a semiconductor laser array as taught by Ota et al. in the modified device of Takada et al. for the purpose of providing a high-speed optical scanning device.

6. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al. in view of Naiki et al., as applied to claims 1, 15 above, and further in view of Ota et al.

Takada et al., as modified by Naiki et al., discloses all the basic limitations of the claimed invention except for the developer for visualization.

However it is old and well known in the art that a latent image is formed by the scanning of the laser beam on the surface of the photosensitive drum, and that the latent image is then developed to become a visible toner image as evidenced by Ota et al. at col. 1, lines 24-28.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the developer unit in the modified device of Takada et al. since Ota et al. teaches this to be known in the printing art to visualize the latent image into a toner image.

***Allowable Subject Matter***

7. Claims 11 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claim 11 is the inclusion therein, in combination as currently claimed, of the limitation that there exists a relationship between the effective writing width and a width of sub-scanning curvature of field in the effective writing width, which is not found taught or fairly suggested by the prior art made of record considered alone or in combination.



**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM  
PRIMARY EXAMINER

May 15, 2004